

## REMARKS

Claims 1-38 and 40-41 are now pending in the application. Claim 39 has been canceled without prejudice or disclaimer. Claim 31 has been amended without introduction of new matter. Favorable reconsideration is respectfully requested in view of the above amendments and the following remarks.

The allowance of claims 1-9 and the indication of allowable subject matter in claims 11-29 and 35-39 are noted with appreciation. Independent claim 31 has been amended to include all of the limitations of claim 39 and any intervening claims. Claim 39 has accordingly been canceled without prejudice or disclaimer. Therefore, independent claim 31 is now in condition for allowance, as are claims 32-38 which variously depend from claim 31.

Claims 10, 31-34, 40, and 41 stand rejected on the ground of nonstatutory double patenting over claims 1 and 10 of U.S. Patent No. 7,154,966 ("the '966 patent"). This rejection is respectfully traversed.

As mentioned above, independent claim 31 has been amended to include all of the limitations of claim 39 and any intervening claims. Since claim 39 was not rejected on these grounds, the rejection has now been rendered moot with respect to independent claim 31 as well as the claims 32-34 which variously depend from claim 31.

The basis for traversing the rejection of claims 10, 40, and 41 is as follows.

As explained in the M.P.E.P. §804 II.B.1. at page 800-21 (Rev. 5, Aug. 2006), "A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). [citation omitted]". That same section of the M.P.E.P. further explains:

Since the analysis employed in an obviousness-type double patenting determination parallels the guidelines for a 35 U.S.C. 103(a) rejection, the factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are employed when making an obvious-type double patenting analysis. These factual inquiries are summarized as follows:

(A) Determine the scope and content of a patent claim relative to a claim in the application at issue;

- (B) Determine the differences between the scope and content of the patent claim as determined in (A) and the claim in the application at issue;
- (C) Determine the level of ordinary skill in the pertinent art; and
- (D) Evaluate any objective indicia of nonobviousness.

The conclusion of obviousness-type double patenting is made in light of these factual determinations.

Since the filing date of the present application is later than the filing date of the '966 patent, a one-way obviousness test is performed; that is, it is determined "whether the invention defined in a claim in the application would have been anticipated by, or an obvious variation of, the invention defined in a claim in the patent." See M.P.E.P. §804 II.B.1.(a) at page 800-22 (Rev. 5, Aug. 2006).

The Office has failed to make out a *prima facie* case of nonstatutory obviousness-type double patenting because it has not determined the scope and content of a claim of the '966 patent relative to a claim in the present application, has not determined the differences between the determined scope and content of the patent claim and the claim in the present application, has not determined the level of ordinary skill in the pertinent art, and has not evaluated any objective indicia of nonobviousness.

Rather, the Office supports its rejection of claims 10, 40, and 41 solely on the basis that "the claimed subject matter claimed in the claims 10, 31-34, 40, 41 requires knowledge of history estimation, which is essentially obtained from the average information in that of claims 1, 10 of Patent No. 7,154,966. Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP §804."

The Office's argument is deficient at least because whether the subject matter presently claimed "requires knowledge of history estimation, which is essentially obtained from the average information in that of claims 1, 10 of Patent No. 7,154,966" is irrelevant to the double patenting rejection.

What is relevant are the differences between the subject matter presently defined by each of claims 10, 40, and 41 and the claims of the '966 patent. For example, each of independent claims 10 and 40 defines "determining a decision boundary for a respective channelization code using the received symbols and at least one decision boundary estimate

determined for another channelization code.” (Emphasis added.) Claim 41 depends from claim 41, and therefore inherits this feature as well.

Using a decision boundary estimate determined for another channelization code is neither disclosed nor suggested in claims 1 and/or 10 of the ‘966 patent (nor in any other claims of the ‘966 patent). For at least this reason, Applicants believe that the subject matter now defined by each of claims 10, 40 and 41 is patentably distinguishable over the claims in the ‘966 patent. Applicant’s view is not contradicted by the Office’s arguments, since those arguments fail to identify the differences between the claims, and do not include any reasons why a person of ordinary skill in the art would conclude that the invention defined in any of the present claims 10, 40, and 41 would have been an obvious variation of the invention defined in any of the claims of the ‘966 patent.

As to the Office’s assertion that “there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent”, Applicants respectfully point out that the disclosure of the ‘966 patent does not mention “determining a decision boundary for a respective channelization code using the received symbols and at least one decision boundary estimate determined for another channelization code,” nor has the Office offered any argument to explain how the description of the ‘966 patent would have supported a claim that defined such a feature.

For at least the foregoing reasons, it is respectfully asserted that each of claims 10, 31-34, 40, and 41 is patentably distinguishable over the claims of the ‘966 patent. Accordingly, it is respectfully requested that the rejection of these claims on the ground of nonstatutory double patenting over claims 1 and 10 of the ‘966 patent be withdrawn.

Claims 10 and 30 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Dorney et al. (US 6,789,225) (hereinafter “Dorney”). This rejection is respectfully traversed.

The invention relates to receivers used in communications systems in which groups of information bits to be transmitted are transformed into respective modulation symbols. When quadrature modulation is employed, the modulation symbols are mapped into streams of in-phase (I) and quadrature (Q) symbols that, after separate processing, are combined to form a signal that is transmitted. As an example, FIG. 3 of the present application depicts the constellation for a 16 Quadrature Amplitude Modulation (16QAM) signal. It can be seen that each symbol has a unique amplitude and phase on the I-Q number plane.

At the receiver, the modulated carrier signal is demodulated, meaning that it is processed to produce an estimate of the original information data stream intended for the receiver. When receiving signals modulated in the manner just described, the receiver's job is to determine which symbol, in the constellation of symbols, the received signal mostly likely represents. One aspect that presents a challenge is that the received signal no longer has exactly the same amplitude and/or phase characteristics that it had when it left the transmitter's antenna. These differences are due to distortions caused by the channel through which the signal passes from the transmitter's antenna to the receiver's antenna.

Consequently, one of the receiver's jobs is to associate each constellation point with a region on the I-Q number plane. It can then be determined which region the received signal falls in, and this information is helpful for demodulating the signal. Regions are separated from one another by so-called "decision boundaries." For instance, as illustrated by the example presented in the application beginning on page 4, line 14, when receiving 16QAM-modulated symbols, the constellation of which is depicted in FIG. 3, the receiver has to determine the distance  $d$  between the Q-axis and the point on the I-axis that is half-way between the first and second columns of constellation points in the right half-plane in order to decide which symbols have been received. Because of symmetry of the constellation, the determined distance  $d$  separates all of the constellation points into a uniform pattern of squares.

As further explained in the specification, the distance  $d$  is proportional to the amplitude of the received signal, and that amplitude varies with time due to signal fading in the propagation channel. Thus, when the receiver is in a fading dip, the distance  $d$  is small, and when the receiver is in a fading peak, the distance  $d$  is large. Accordingly, the receiver must regularly update its determination of the distance  $d$ .

FIG. 4 shows a memory 410 after the combiner 406 that stores a number of complex symbols generated by the combiner. A decision boundary estimator 412 computes the distance  $d$  separately for each channelization code based on respective symbols in the memory 410 and on respective previously computed values of the distance  $d$  for each channelization code. Using the estimates of the distance  $d$  computed by the estimator 412, a soft bit value estimator 414 computes so-called soft bit values from the complex symbols stored in the memory 410.

Having the memory 410 between the combiner 406 and the decision boundary estimator 412 as in FIG. 4 is costly in several ways. For example, the memory size must be

on the order of five kilobits, and this requires a corresponding area on one of the integrated circuit chips used for the receiver. Applicants' invention addresses this problem in embodiments that enable the memory to be eliminated.

More particularly, independent claim 10 defines "A method in a receiver of *determining decision boundary estimates* based on received symbols from one or more channelization codes, comprising the step of: *determining a decision boundary* for a respective channelization code *using* the received symbols *and at least one decision boundary estimate determined for another channelization code.*" (Emphasis added.) Claim 30 depends from claim 10, and therefore also defines at least these features.

By using a previously-determined decision boundary estimate, in this case one that was determined for another channelization code, the need for the memory discussed above and in the Background section of the application (e.g., the memory 410) is eliminated.

The Office's reliance on Dorney et al. is unfounded because Dorney et al. is silent with respect to methods for determining decision boundary estimates, and certainly does not disclose "determining a decision boundary for a respective channelization code using the received symbols and at least one decision boundary estimate determined for another channelization code."

The Office alleges that claim 10's recitation of "determining a decision boundary for a respective channelization code using the received symbols and at least one decision boundary estimate determined for another channelization code" is disclosed in Dorney et al. in Figure 3, element 300; column 1, lines 44-51; column 3, lines 25-50; Figure 4, column 3, line 60 to column 4, lines 38. The Office further alleges that the limitation "wherein when the received data is estimated utilizing the metric determined from previous symbols" is disclosed by Dorney et al. in element 300 of Figure 3.

Applicants respectfully disagree because Dorney et al. is not concerned at all with determining a decision boundary for a channelization code, but rather is concerned with techniques for determining approximate locations of errors within a frame of data. (See, e.g., Dorney et al. at column 2, lines 22-25.) As explained by Dorney et al. in column 1, lines 26-36, "when a frame of data such as video data known to contain errors is decoded for display, data recovery and/or error concealment techniques may be employed to mitigate visual distortions or artifacts caused by the errors. However if the position of bit errors within the frame cannot be estimated, substantially all or most of the error frame data, including both corrupted and uncorrupted data, may have to be discarded. Therefore, data recovery and/or

error concealment techniques may be made substantially less practical when even the uncorrupted data is discarded.” Dorney et al. goes on to conclude “Thus, effectiveness of some data recovery and/or error concealment techniques may improve substantially if approximate locations of errors within the frame of data are known.” (See, e.g., Dorney et al. at column 2, lines 22-25.)

The text relied on by the Office Action is equally silent with respect to determining decision boundaries for different channelization codes. More particularly, element 300 shown in Figure 3 is a "bit error position estimation system". (See, e.g., Dorney et al. at column 3, lines 25-27.) Identifying the position of a bit error in a frame of data has nothing to do with determining a decision boundary for use in demodulating a received signal.

Dorney et al.'s text at column 1, lines 44-51 summarizes a technique for estimating bit error locations, and has nothing to do with generating a decision boundary.

Column 3, lines 25-50 is a detailed description of the bit error position estimation system 300. At no point does the system determine a decision boundary for demodulating a received signal.

Figure 4 and the text at column 3, line 60 to column 4, line 38 describes a process for estimating the bit error locations from generated data. Again, this is completely irrelevant to determining a decision boundary as defined by Applicant's claims.

Although Applicant does not believe that the “soft decision distance” referred to by Dorney et al. in various locations (e.g. at column 3, lines 63-64) can reasonably be considered analogous to a decision boundary as defined by Applicant's claims, even if the Office were to take a different view, Dorney et al. are silent with respect to channelization codes, and therefore do not disclose any technique for determining any metric “*for a respective channelization code* using the received symbols and at least one decision boundary estimate determined *for another channelization code*.”

For at least the foregoing reasons, claims 10 and 30 are believed to be patentably distinguishable over the subject matter disclosed by Dorney et al. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. §102(e) be withdrawn.

Claims 40-41 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Dorney. This rejection is respectfully traversed.

Like independent claim 10, independent claim 40 defines “determining a decision boundary for a respective channelization code using received symbols and at least one

decision boundary estimate determined for another channelization code.” Therefore, the subject matter of independent claim 40, as well as that of dependent claim 41, is patentably distinguishable over the Dorney et al. reference for at least the reasons set forth above with respect to claim 10.

For at least the foregoing reasons, claims 40 and 41 are believed to define subject matter that is patentably distinguishable over that which is disclosed by Dorney. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. §103(a) be withdrawn.

The application is believed to be in condition for allowance. Prompt notice of same is respectfully requested.

Respectfully submitted,  
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